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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/196,347 11/19/98 BROWN

S 33536US1

IM62/0202

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EXAMINER

PREISCH, N

ART UNIT

PAPER NUMBER

1764

DATE MAILED:

02/02/01

13

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

**Office Action Summary**

Application No.

09/196,347

Applicant(s)

BROWN ET AL.

Examiner

Nadine Preisch

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 January 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 36, 41-54, 58 and 62-67 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 36, 41-54, 58 and 62-67 is/are rejected.
- 7) ☐ Claim(s) 36 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

**Attachment(s)**

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 18) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Continued Prosecution Application*

The request filed on 1-12-01 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/196,347 is acceptable and a CPA has been established. An action on the CPA follows.

### *Removal of Rejections Under 35 U.S.C. § 102 and/or 103*

Applicants' amendments submitted in paper no.12, filed 1/12/01 are sufficient to overcome the following rejections:

1) Claims 36, 47, 49, 50, 52, 53, 58 and 65 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sarrazin et al.(5,364,998).

2) Claims 36, 43, 49, 50, 52, 53, 58 and 66 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Trinh Dinh et al.(4,504,593).

3) Claims 36, 41-46, 49-53, 58, 62-64 and 66 under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,475,173) in view of Lindlar et al.(3,715,404).

4) Claim 67 under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,475,773) in view of Lindlar et al.(3,715,404) as applied to claims 36-46, 49-53, 55-64 and 66 above, and further in view of Collins (4,126,645).

5) Claim 48 under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,475,773) in view of Lindlar et al.(3,715,404) as applied to claims 36-46, 49-53, 55-64 and 66 above, and further in view of Sarrazin et al.(5,364,998).

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***Claim Objections***

Claim 36 is objected to because of the following informalities:

In line 1, the term "cocntacting" should be spelled "contacting". In line 2, the term "unsaaturated" should be spelled "unsaturated".

Appropriate correction is required.

***Claim Rejections - 35 U.S.C. § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 36, 42, 43, 47, 49, 50, 51-53, 58, 62, 63, 65, and 66 are rejected under 35 U.S.C. 103(a) as obvious over Sarrazin et al.(5,364,998) in view of Cosyns et al.(4,409,410) or Polanek et al.(5,227,553).

Applicants are claiming several processes for the hydrogenation of unsaturated compounds. The processes involve contacting a feed with a catalyst comprising palladium, an inorganic support, silver, an alkali or alkali metal compound, and a selectivity enhancer as defined in claims 36, 52 and 58. The dependent claims contain limitations directed at a gallium selectivity enhancer and palladium/selectivity enhancer amounts.

The reference of Sarrazin et al.(5,364,998) discloses a process for the selective hydrogenation of highly unsaturated compounds such as acetylene compounds and diolefins contained in a monoolefin feed. See abstract, lines 1-2, column 1, lines 41-43 and column 6, lines 46-47. The process involves contacting a feed containing hydrogen with a catalyst. See column 3, lines 39-45. The catalyst comprises palladium, gallium and a support such as silica or alumina. See column 1, lines 56-58 and column 2, lines 1-2. The support can also comprise a spinel in the form of zinc aluminate which can be combined with other aluminates including alkali containing aluminates. See column 8, lines 3-7. Sarrazin et al.(5,364,998) discloses an example where a palladium/gallium/alumina catalyst is contacted with a feed to hydrogenate a highly saturated feed in the form of butadiene (butadiene = diolefin). See column 4, lines 1-50. The amount of palladium is 0.2 to 5% weight and the amount of gallium is 0.1 to 5% weight. See column 1, lines 56-61 and 63-67.

The reference of Sarrazin et al.(5,364,998) succeeds at disclosing a process for the hydrogenation of highly unsaturated hydrocarbons which involves the use of a catalyst containing components corresponding to applicants' palladium, gallium, alkali metal component and support. In addition, the reference succeeds at disclosing palladium/gallium amounts that are within the component amounts/ratios claimed by applicants.

It is noted that the reference does not refer to gallium as a "selectivity enhancer". However, gallium is considered function as a selectivity enhancer because a gallium containing catalyst is contacted with the same unsaturated feed claimed by applicants and would therefore accomplish a similar function of "selectivity enhancing". In addition, the reference's palladium/selectivity enhancer amount is considered to meet applicants' limitation of "a sufficient amount to effect a selective hydrogenation of a highly unsaturated compound" because the disclosed process accomplishes the selective hydrogenation of a highly unsaturated compound.

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Several differences are noted between applicants' invention and the reference of Sarrazin et al.(5,364,998). The reference does not disclose the use of a silver component in the catalyst of Sarrazin et al.(5,364,998). However, Sarrazin et al.(5,364,998) teaches that the reference of Cosyns et al.(4,409,410) illustrates that silver is known to significantly improve the catalytic properties (selectivity and activity) of Group VIII metals in hydrogenations. See Sarrazin et al.(5,364,998), column 1, lines 30-40.

In addition, the reference of Sarrazin et al.(5,364,998) does not disclose a lead enhancer.

The reference of Cosyns et al.(4,409,410) illustrates that the selectivity of palladium is enhanced with respect to diolefin hydrogenation when silver is present. Enhanced selectivity can be observed by comparing examples 1 and 2 of the reference wherein less 1-butene is hydrogenated. See column 4, lines 1-10.

The reference of Polanek et al.(5,227,553) is cited to illustrate that cadmium (Cd), tin (Sn), lead (Pb), and silver (Ag) are known selectivity promoters for palladium supported catalysts. See column 2, lines 50-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made desiring to increase the diolefin selectivity of the Sarrazin et al.(5,364,998) catalyst to add a silver component to the catalyst because the references of Cosyns et al.(4,409,410) and Polanek et al.(5,227,553) illustrate that silver is known to increase the selectivity of palladium hydrogenation catalysts. Applicants have not shown anything unexpected by adding a known selectivity enhancer to the catalyst of Sarrazin et al.(5,364,998).

It would have been obvious to one of ordinary skill in the art at the time the invention was made desiring greater selectivity in the Sarrazin et al.(5,364,998) process to include a lead

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component in the catalyst because the reference of Polanek et al.(5,227,553) illustrates that lead is a known selectivity enhancer.

***Claim Rejections - 35 USC § 103***

Claims 36, 41-44, 49-53, 58, 62, 63 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,475,173) in view of Polanek et al.(5,227,553).

The reference of Cheung et al.(5,475,173) discloses a selective hydrogenation process for a highly saturated hydrocarbon in the form of C<sub>4</sub>-C<sub>10</sub> diolefins (e.g. dienes). See column 1, lines 46-54. The feed also contains mono-olefins such as 1-butene. See column 3, line 55. Cheung et al.(5,475,173) also teaches that the feed contains added hydrogen. See column 4, lines 20-25.

The process involves contacting the hydrocarbon feed with a catalyst containing palladium, silver and an alkali metal halide in the form of an alkali metal fluoride. See column 1, lines 59-64. The palladium is present in an amount of 0.05 to 0.6 weight percent. See column 2, lines 3. Cheung et al.(5,475,173) teaches that the catalyst support is selected from alumina, silica or zinc aluminate (zinc aluminate = spinel). See column 1, lines 64-66.

The reference of Cheung et al.(5,475,173) succeeds at disclosing a hydrogenation process for saturated hydrocarbons involving the use of a catalyst with components corresponding to applicants' palladium, silver, alkali metal halide and support components. The reference also succeeds at disclosing palladium amounts overlapping those claimed by applicants as well as the use of a feed containing hydrogen.

Several differences are noted between the reference of Cheung et al.(5,475,173) and applicants' claimed invention. The reference does not disclose applicants' claimed selectivity enhancers or selectivity enhancer amounts.

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The reference of Polanek et al.(5,227,553) is cited to illustrate that cadmium (Cd), tin (Sn), lead (Pb), and silver (Ag) are known selectivity promoters for palladium supported catalysts. See column 2, lines 50-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made desiring greater selectivity to add a cadmium, tin, or lead component to the catalyst of Cheung et al.(5,475,173) because the reference of Polanek et al.(5,227,553) teaches that such components are known selectivity enhancers for palladium supported catalysts. Applicants have not shown anything unexpected by including known enhancers in the catalyst of Cheung et al.(5,475,173).

In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add any amount of selectivity enhancer required to achieve a desired level of hydrogenation, including the amounts claimed by applicants, because there is no invention where the difference in proportions is not critical and is ascertained by routine experimentation since the determination of workable ranges is not considered to be inventive. In re Swain and Adams, 70 USPQ 412 (CCPA 1946).

### ***Claim Rejections - 35 USC § 103***

Claims 36, 41, 43, 44-46, 49-53, 58, 62-64 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,583,274) in view of Lindlar et al.(3,715,404).

The reference of Cheung et al.(5,583,274) discloses a process for the hydrogenation of alkynes (preferably acetylene) contained in feeds. See abstract, lines 1-3 and column 1, lines 3-6. The process involves contacting the feed with a catalyst which comprises silver, an alkali



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metal fluoride and palladium on an alumina support. See column 1, lines 63-66 and column 2, lines 1-10. Cheung et al.(5,583,274) discloses 0.01-1 wt% palladium. See column 2, lines 5-6. The reference further teaches that process conditions include the presence of hydrogen. See column 3, lines 50-54.

The reference of Cheung et al.(5,583,274) succeeds at disclosing a hydrogenation process for highly unsaturated hydrocarbons in the form of alkynes involving the use of a catalyst with components corresponding to applicants' palladium, silver and alkali metal fluoride components. The reference also succeeds at disclosing palladium amounts overlapping those claimed by applicants as well as the use of a feed containing hydrogen.

A difference is noted between the reference of Cheung et al.(5,583,274) and applicants' claimed invention. The reference does not disclose applicants' claimed selectivity enhancers or selectivity enhancer amounts.

The reference of Lindlar et al.(3,715,404) is cited for the general teaching that it is well known in the art that lead, bismuth, cadmium, tin, cadmium, thorium and/or mercury enhance the activity of palladium catalysts which are utilized in selective hydrogenation processes. See column 1, lines 11-26.

Since Cheung et al.(5,583,274) discloses a selective hydrogenation process for alkynes contained in a feed, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the palladium containing catalyst to include lead, bismuth, tin, thorium, mercury and/or cadmium because the reference of Lindlar et al.(3,715,404) teaches that lead, bismuth, tin, thorium, mercury and/or cadmium are known selectivity enhancers for palladium hydrogenation catalysts. One of ordinary skill would have been motivated to add lead,

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bismuth, tin, thorium, mercury and/or cadmium to the Cheung palladium catalyst because such components have the benefit of enhancing selective hydrogenation.

In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add any amount of selectivity enhancer required to achieve a desired level of hydrogenation, including the amounts claimed by applicants, because there is no invention where the difference in proportions is not critical and is ascertained by routine experimentation since the determination of workable ranges is not considered to be inventive. In re Swain and Adams, 70 USPQ 412 (CCPA 1946).

***Claim Rejections - 35 USC § 103***

Claims 67 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,475,173) in view of Polanek et al.(5,227,553) as applied to claims 36, 41-44, 49-53, 58, 62, 63 and 66 above, and further in view of Collins (4,126,645).

A difference is noted between the modified teachings of Cheung et al.(5,475,173) and applicants' claimed invention. The teachings do not suggest a palladium skin coating as claimed by applicants.

The reference of Collins (4,126,645) is cited for the teaching that palladium supported catalysts with catalyst layers not more than 150 microns ( m) accomplish selective hydrogenation at advantageous rates and display long catalyst life between regenerations. See column 1, lines 55-68 and column 2, lines 1-3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to distribute palladium in a thickness of less than 150 m on the modified Cheung et al.(5,475,173) catalyst because the reference of Collins (4,126,645) teaches that palladium

distributed in a thickness of less than 150 m advantageously increases the selective hydrogenation rate and increases the catalyst life between regenerations.

***Claim Rejections - 35 U.S.C. § 103***

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,475,173) in view of Polanek et al.(5,227,553) as applied to claims 36, 41-44, 49-53, 58, 62 and 66 above, and further in view of Sarrazin et al.(5,364,998).

A difference is noted between the modified Cheung et al.(5,475,173) catalyst and applicants' claimed invention. The modified teachings do not suggest a gallium component.

The reference of Sarrazin et al.(5,364,998) discloses a process for the selective hydrogenation of highly unsaturated compounds such as acetylene compounds and diolefins contained in a monoolefin feed. See abstract, lines 1-2, column 1, lines 41-43 and column 6, lines 46-47. The catalyst comprises palladium, gallium and a support such as silica or alumina. See column 1, lines 56-58 and column 2, lines 1-2. Sarrazin et al.(5,364,998) discloses an example where a palladium/gallium/alumina catalyst is contacted with a feed to hydrogenate a highly saturated feed in the form of butadiene (butadiene = diolefin). See column 4, lines 1-50. The amount of palladium is 0.2 to 5% weight and the amount of gallium is 0.1 to 5% weight. See column 1, lines 56-61 and 63-67. The example illustrates that a palladium catalyst containing gallium selectively hydrogenates a higher percentage of highly unsaturated compounds in the form of butadiene. See column 4, lines 41-45.

The reference of Sarrazin et al.(5,364,998) succeeds a illustrating that gallium enhances the selective hydrogenating ability of palladium.

Since the modified teachings of Cheung et al.(5,475,773) include a palladium component, it would have been obvious to one of ordinary skill in the art at the time the invention was made

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to add a gallium component to the palladium catalyst because the reference of Sarrazin et al.(5,364,998) illustrates that gallium enhances the selective hydrogenating ability of palladium. One of ordinary skill would have been motivated to add gallium to a palladium catalyst because such a component desirably increases the degree of selective hydrogenation.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

a timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. a terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 36, 41, 43-46, 49, 58, 64 and 66 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 12, 18, 19, 20, 24, 28, 34 and 35 of copending Application No.09/459,846 in view of Lindlar et al.(3,715,404).

This is a provisional obviousness-type double patenting rejection.

The present application and copending Application No. 09/459,846 both contain claims drawn to hydrogenating an unsaturated hydrocarbon in the presence of a catalyst containing a palladium component, a silver component, a support and an alkali metal halide component.

A difference is noted between the present claims and the claims of Application No. 09/459,846. The claims of Application No. 09/459,846 do not contain limitations directed at selectivity enhancers.

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The reference of Lindlar et al.(3,715,404) is cited for the general teaching that it is well known in the art that lead, bismuth, cadmium, tin, cadmium, thorium and/or mercury enhance the activity of palladium catalysts which are utilized in selective hydrogenation processes. See column 1, lines 11-26.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the claims of 09/459,846 which define a palladium containing catalyst to include lead, bismuth, tin, thorium, mercury and/or cadmium because the reference of Lindlar et al.(3,715,404) teaches that lead, bismuth, tin, thorium, mercury and/or cadmium are known selectivity enhancers for palladium hydrogenation catalysts. One of ordinary skill would have been motivated to add lead, bismuth, tin, thorium, mercury and/or cadmium to the claimed palladium catalyst because such components have the benefit of enhancing selective hydrogenation.

***Prior Art of Record***

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure.

The attached references disclose hydrogenation processes employing catalysts similar to those claimed by applicants.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nadine Preisch whose telephone number is 703-305-2667. The examiner can normally be reached on Monday through Thursday from 7:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703-308-4311. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-5408 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

N.P.  
January 31, 2001

NP

**NADINE PREISCH**  
**ART UNIT 1764**

